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ABSTRACT

Although there is little literature on the topic, there seems to be no reason why quality circles (QCs) could not be implemented in an educational organization. The most important obstacles are the seeming lack of tangible results in education, the lack of a tradition of group decision making and participative management, and the confusion over formal lines of responsibilities. QCs can be a tool for the whole organization to improve its effectiveness. QCs can improve the effectiveness and efficiency of organizational processes through effects on interpersonal and interdepartmental relationships, such as improved communication, understanding of others, and decreased absenteeism and frustrations. The inherent weakness of QCs is that they need to operate within the social effects they are claimed to produce themselves. More and better research is needed to find the effects QCs can yield under what conditions. Theory-building is needed. Management in training and education should reconsider the QC concept and seriously balance potential benefits and caveats. (Includes 8 pages of references and 11 pages of documents reviewed.) (CML)

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Quality Circles:

can they be used in training and education?

A.J. Schutten

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University of Twente

Quality Circles: can they be used in training and education?

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Department of Education

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FOREWORD

This literature review and investigation has been written in the context of a graduation assignment, that was conducted within a large service organization (Schutten, 1989). The reason to write this report is to present a tool to the training department of this organization to improve its performance.

The study took place in the period October 1988 - February 1989. Special thanks should go to André Reimerink, for helping me to find a representative sample of literature on Quality Circles. Without the expertise of André I wouldn't have been able to write this report at all. My sincere feelings of thanks also go to Audrey Hattie for typing the first draft of this report and to drs. Jose Gieskes for borrowing me a pile of useful literature. Last but not least to dr. Wim Nijhof and drs. Cees van Vilsteren for supporting me and being creative and intellectual resources in creating thoughts that are the fundamentals of this report.

Enschede, February 1989.

Aart Schutten

PREFACE

Writing a report on the use of Quality Circles (QCs) in 1989. Isn't that a bit too late? Most of the literature has been written before 1984 and the last few years the popularity of the QC concept seems to be declining. Well, it is certainly not too late. In 1989 it is possible to do what couldn't have been done 5 or 10 years ago: make an analysis of the effects of the QC movement so far.

However, writing a report on Quality Circles primarily aimed at professionals working in the field of Dutch training and development presents a major problem. The target audience of this report is not familiar at all with the QC concept. Therefore, it is required to provide an introduction on the concept of QCs.

In part I of this report an introduction to the QC concept will be presented, together with a statement on the status of the QC movement in the year 1989. Chapter 1 includes an overall introduction to QCs. Topics in this chapter are the definition, history, growth, philosophy, organization, process and techniques of QCs. The areas of use for QCs will be dealt with in chapter 2. These areas will be distinguished: the problem, the cultural and the organizational area. In chapter 3 will be presented an overview of what QCs can accomplish. Topics here are the results QCs can yield, factors leading to success or failure and the evaluation of QCs. Because the first three chapters are somewhat extensive to those unfamiliar with the QC concept, each chapter contains a summary as well. Part I concludes with chapter 4, wherein the future of the QC movement will be predicted. Issues of QCs being a fad or not, the QC life-cycle, the shift in the literature on QCs will be discussed and the chapter will finish with a definite statement on QCs.

Part II, although much smaller, contents the central option of this report. Part II attempts to answer the questions, which will be presented in chapter 5. The first main issue for investigation will be discussed in chapter 6: the existence of education specific factors that inhibit the use of QCs and the transferability of these factors to the field of training and development. The four applications of QCs in training and development, subject of the second main issue for investigation and the reason to initiate this report, will be discussed in chapter 7.

Chapter 7 is the ultimate purpose of this report to present the opportunities for a training department to apply QCs in four different ways. The final answers on the questions for investigation will be presented in chapter 8.

A training department in this report is a part of an non educational organization that is responsible for the organized learning processes within that organization, for the sake of members of that organization to improve their levels of knowledge and skills and to alter their attitudes into the wished directions. The field in which a training department is operating is called training and development.

It must be clear that this report doesn't have the intention to be a comprehensive literature review. It is more a report of a thinking process on the question what is left of the QC movement in 1989 and what are the most important contributions made to the theory building of the QC concept and most of all: what are the opportunities for a training department to apply QCs.

1. AN INTRODUCTION TO QUALITY CIRCLES

'To implement Quality Circles there has to be a determined support by management, a belief in people and a willingness to provide the training that has proven so essential. Every organization is made up of different people, with different problems. Think of Quality Circles, not as a 'cure-all', but as a unique tool with which to generate an atmosphere in which people solve their own problems'.

Donald L. Dewar.

Quality is fitness for use, plus reliability, delivered at a marketable price.

Frank M. Gryna.

1.1 What a Quality Circle is

The definition of Quality Circles (QCs) is an evolving one, as will be shown in the section 2.1. According to Mourey and Mansfield (1984) a Quality Circle is

'a small group of employees from the same work area who meet regularly and voluntarily to identify, solve and implement solutions to work - related problems. Members of the QC are usually trained in two kinds of techniques; problem solving methods and group processes. The Circle leader is often a supervisor who is first trained by someone experienced in the QC process. The leader in turn trains the circle members. The circle works on one problem at a time and proposed solutions are presented to management for approval'.

At first sight, most definitions of QC's in the literature are alike. Differences are noted when one takes a closer look at the elements that make up the definition. One of the definitions in the reviewed literature found covering the concept of QC's best, Mourey and Mansfield's description contains most essential elements that make up a QC.

1. A small group of employees from the same work area.

Most figures mentioned in the literature would cover the range from 6 to 10 and members, with an ideal number of 7 or 8 members (Martell and Tyson 1983; Dewar, 1984) and at most 12 members (Goldstein, 1985). Cole (1979) reports that in Japan the most common range is 5 to 10 members. Although most authors just state that employees have to be from the same work area (e.g. Lawler and Mohrman, 1985; Gryna, 1981), Chase (1983) explains what that means: 'ideally, members of each circle should be from the same work area, do similar work, or interact closely to get a particular job done so that the problems they select will be familiar and important to all of them.

2. Employees meet voluntarily and regularly.

Nearly all authors make clear that membership has to be voluntary. Some make this very explicit, e.g. Martell and Tyson (1983): 'membership is strictly voluntary. No one is required to participate and no one is kept out'. But Cole (1979) found that membership in American QC's is usually voluntary and in Japanese 'not truly voluntary' because most Japanese QC's are

institutionalized processes. Goldstein (1985:511) has his own ideas about voluntary membership: 'to encourage as wide participation as possible, it is desirable not to emphasize the voluntary aspect of membership'. Finally, Elvins (1985) found that 30% of the members joined somewhat involuntarily, meaning under pressure from superiors or colleagues. However regardless for the reasons of joining, people 'contributed either relatively equal or relatively major participation'.

Typical QC - meetings are held each week for one hour. But alternatives do exist. The minimum is about an hour per month. The maximum a few hours per week. (Ferris and Wagner, 1985; Dewar, 1984). In a Japanese survey meetings were found to vary from meeting once a month (40 percent) or twice a month (40 percent) to three or more times a month (20 percent), for a duration of between 60 to 90 minutes (Cole, 1979). Goldstein (1985) notes that 'it is best to err on the side of fewer meetings of less length'. He suggests meeting to be held from between twice a week to once a month, for periods of between half an hour to two hours.

3. Members identify, solve and implement one problem at a time and proposed solutions are presented to management.

Nearly all authors include in their description of QC's that members identify, analyse and solve problems. What kinds of problems are solved will be discussed in section 2.1. The selection of a problem is a QC prerogative. During the identification and analysis of problems a QC can call for help from QC external experts, mostly cstaff members of the organization. Goldstein (1985), for a number of reasons clearly suggests that QCs restrict their activities to generating ideas. Only if a QC demands the implementation function, it should receive it. There was no author rejecting the idea of solving one problem at a time, it is often mentioned however that more problems can at least be identified at the same time (e.g. Dewar, 1984).

4. Members receive training in problem solving methods and group processes. Circle leader is often a supervisor and trains members.

Every aspect of QC's related to training is dealt with in chapter 7. Here it is suffice to say that training in problem solving methods and group - processes ('group dynamics') is essential to the success of using QC's. The QC leader and other QC - functions are given attention to in section 1.4.

1.2 History and Growth of Quality Circles

1.2.1 Origin of Quality Circles

After World War II the Japanese had to rebuild their country. Before the war the world viewed Japanese products as low priced and of shabby quality. The Japanese realized that for a long-term survival, they had to change their country into a productive economy. General Douglas MacArthur asked the U.S. Government to send someone to teach better quality control methods to the Japanese. At that time the concept of training quality control was popular in the U.S. However, in the U.S. training was aimed primarily at specialists in quality control departments.

In the late 40's William Edwards Deming arrived in Japan. Deming started teaching the Japanese techniques in statistical quality control. He stressed that everyone in a company needs to plan, collect data, analyze and construct his work to properly maintain quality. These concepts made up the Deming-wheel. Deming returned to Japan again and again.

In 1954, Joseph M. Juran joined and started teaching the concept of total quality control. The quality control training was a top-down approach. The training programs first were aimed at top executives of Japan's leading industrial companies. Other courses then were provided for upper- and middle-management. The Japanese Union of Scientists and Engineers (JUSE) helped importantly with training foremen. The large number of foremen caused unusual instructional methods: training courses were broadcast on national radio and copies of the broadcast text were sold at newsstands.

Foremen were encouraged to call upon their workers in solving problems. Management decided to provide training to workers on a voluntary basis. In 1961, Kaoru Ishikawa, under the sponsorship of JUSE, integrated the theories of Maslow, Herzberg and McGregor (see section 1.3) and the quality concepts taught by Deming and Juran. The result was called Quality Control Circles. The first Circles were registered with JUSE during May 1962. From that time on, employees from top to bottom working within large companies that used the concept of quality control, were familiar with this concept.

Japan's shabby quality image improved rapidly. By 1970 the quality of Japanese products was no longer considered low. Today Japan is viewed as a number one country in high ranking quality products in a number of fields: cameras, cars, television sets, audio sets, integrated circuits, etcetera.

Japan's efforts on quality control can be summarized in a six-point program to maintain quality (Ingle, 1982b):
- quality audits,
- nation-wide promotion for good quality,
- quality training,
- use of higher statistical methods,
- nation-wide quality control activities,
- Quality Circles.

QCs are thus not the only cause of Japan's current leadership in quality. To say with Gryna (1981): 'Circles were a dramatic element, but only one element of Japanese manufacturer's success'. In the 80's, the use of QCs alone saves the Japanese 20 to 25 billion dollars a year. Still workers solving problems is an old idea. Ingle (1982b) mentions a number of companies that used this ages ago.

The tremendous Japanese success thus started with two American scientists teaching quality concepts, although Cole (1980) thinks that the Japanese 'willingness to give all the credit to American experts is misleading in this regard'. Juran (1981b) discovered about the success of QCs in other countries that 'none of these attained the results achieved by the Japanese. So who performed the miracle?'.

In the U.S. the first article on Japanese Quality Control Circles was published in 1967. One of the first reported implementations of QCs in the U.S. was in 1970 at Smith Kline Instruments. Often Lockheed is considered to be the first to implement QCs in 1974. The major implementors at Lockheed were W.S. Rieker, D.L. Dewar and J.F. Beardsley.

In the late 70's, the concept of QCs started booming in the U.S., with a peak in the early 80's. The use of QCs in the U.S. differs from that in Japan. The literature reviewed in this report will almost completely deal with the use and effects of QCs in the U.S.

1.2.2 Figures on the use of Quality Circles

Although there were earlier implementations in the U.S., Lockheed is mostly known as the company starting the use of QCs in the U.S. in 1974 at a unit of the Lockheed Missiles and Space Company in Sunnyvale, California. By the end of 1975, Lockheed had 15 QCs, an amount that had doubled by 1977 (Ferris and Wagner, 1985). In 1978, 25 companies were involved (Gryna, 1981). Ramsing and Blair (1982) estimate that in 1980 more than 3,000 QCs had been implemented in more than 500 organizations. In 1985 it was estimated that 90% of the Fortune 500 firms had QCs (Lawler and Mohrman, 1985).

Barra (1983) found that there were about 1,200,000 QCs on a worldwide basis, involving 12,000,000 employees. The figures for various parts of the world are as follows:

	QCs
Japan	1,000,000
Korea	50,000
Rest of Asia (e.g. China, Taiwan)	50,000
South America (mostly Brazil)	50,000
United States	25,000
Canada	2,500
Mexico	1,000
France	1,000
U.K., Belgium, Germany, Netherlands, Denmark, Sweden and Norway	1,500

Gryna (1981) reports about 1,000,000 registered (with JUSE) and unregistered QC's in Japan, each circle solving about 3 problems a year. That QCs are a very strong tool for improvements in Japan has been shown by Fujita (1981). He gives the amount of 860,000 ideas, generated by 46,400 Toyota employees and 1,270,000 ideas generated by 56,300 Nissan employees in 1980. In both companies 85% of the generated ideas were implemented. These ideas are only a by-product (!) of QC outcomes. Recent figures on the use of QCs were not found in the literature reviewed.

1.2.3 The reasons for success

Lawler and Mohrman (1985) explain the U.S. popularity of QCs primarily by the success of high-quality Japanese products at competitive prices in the fields noted above. Trying to explain this Japanese success and the favourable press reports of early uses of QCs in the U.S. 'led people came to see QCs as a way for U.S. companies to regain competitiveness'. Lawler and Mohrman further explain the QC success by four features of QCs:

1. QC-programs are accessible: management can buy complete packages at fixed prices.

2. Because QCs don't have to involve everyone, management can try them by starting just one or a few; so without much costs, effort and risk.

3. Managers don't have to give up any control or prerogatives, because QCs have no decision-making power. Management can easily eliminate QCs if they want to.

4. Quality Circles are (were?) a fad; every manager has to try them.

Hulshof (1987) notes that the peak in the QC-interest in the U.S. occured in 1981. After 1981, the QC-fad started fading. The question if QCs really are a fad or a custom will be answered in section 4.1.

1.3 Philosophy of Quality Circles

1.3.1 Motivation theories

The philosophical background of QCs consists of the motivation theories by Maslow (1954), Hertzberg (1959) and McGregor (1960). It was Kaoru Ishikawa who tied these theories to the concept of quality control in 1961.

In Maslow's concept of a hierarchy of needs, QCs appeal to the highest level requirements for self-esteem and self-fulfilment. Hertzberg's statement is that motivation must be found in the work itself by incorporating learning, direct communication, feedback, responsibility and

recognition. QCs appeal to this concept, or are at least supposed to do so. McGregor's theory Y says that the intellectual potential of the employee should be recognized. Part of Theory Y is the assumption that a person doesn't inherently dislike work and that many more people are able to contribute creatively to the solution of organizational problems than do so. A critique of Maslow and Hertzberg can be found in Thierry and Koopman-Iwema (1984).

1.3.2 Theory Z

One of the best known modern management theories is Ouchi's (1981) Theory Z. Theory Z is not a theory that QCs are based upon but a theory that tries to explain the success of QCs and other phenomena found to be contributing to Japan's post-war success in the world.

In his attempt to do this, Ouchi makes a difference between the way Americans run a business (Theory A) and the way the Japanese are apt to do that (Theory J). After a thorough analysis of Theory J Ouchi discovered that Theory J is not fully applicable in American society. Therefore, he suggests Theory Z is a set of prescriptions how employees should be motivated for increased productivity.

Theory Z is the American version of Theory J. In essence, they are the same. One of the characteristics of both theories is what Mourey and Mansfield (1984) call the 'significant quality idea (...) that other departments within an organization are considered the 'customer'. Every department is responsible for delivering only good quality products to the next group of users'.

Ouchi's Theory Z has had a tremendous impact on thinking about how organizations should be run. Despite this impact there also has been critique on Theory Z. Sullivan (1983) for example stresses that Theory Z is limited supported by research findings and that Ouchi's grounding of the theory in humanistic management seems unwarranted.

1.3.3 Other conceptual relations with Quality Circles

Yager (1980) explains the application of QCs relation to behavioral science concepts, which he thinks are 'soundly developed in a Quality Circle' because the QC process is based on 'sound, proven concepts'. It is useful for the understanding of the QC concept to see what behavioral science concepts are related to what QC-applications.

Rendall (1981) uses Toffler's 'The Third Wave' (1980) to explain the ideas behind QCs that make QCs one of the instruments for now and for the future. According to Rendall QCs are 'an opportunity and a challenge with unlimited possibilities for workers, employees and trainers'. Rendall's frequently referenced article and Toffler's Third Wave after all are more serious than they on first sight look like to those unfamiliar with Toffler's work.

Metz (1981b) frequently referenced article as well foresees that U.S. organizations to evolve with the needs and expectations of both workers and society 'must adapt faster to meet the increasing challenges of the 80's'. The six challenges he then notes resemble the ones in Rendall's article.

1.4 Organization of Quality Circles

1.4.1 The structuring of Quality Circles

The typical structuring of QCs within an organization is shown in exhibit 1.1 (copied from Hanley, 1980):

Exhibit 1.1: A Quality Circle structure

The following sections on the QC functions are based on Ingle (1982b), Gryna (1981), Hanley (1980) and Dewar (1984).

1.4.2 The Steering Committee

The Steering Committee, sometimes referred to as operating committee, is an advisory group composed of representatives of all the major elements of an organization. The Steering Committee sets the guidelines or limits regarding the types of projects QCs may undertake, is responsible for joint relations between management and the QC program, maintains records on QC progress, costs, improvements and projects, promotes the QC program organization wide, reviews training programs and materials and supports the facilitator's functioning.

Goldstein (1985) found that idea generation is inhibited when the authority gradient is high. He thinks the long QC chain has the effect of suppressing the generation of ideas through overcontrol and therefore suggests that it should suffice 'a steering committee alone overseeing the QC's having a vertical organizational slice as its membership to play down the hierarchical position'.

1.4.3 The Coordinator

Because a coordinator is only useful when there are about eight or more QCs in an organization and this chapter is supposed to be an introductory one, no further attention will be paid to the coordinator. It will suffice to note that a coordinator primarily is the facilitator of the facilitators. The tasks of the coordinator are included in those of the Steering Committee.

1.4.4 The Facilitator

A Facilitator is a key person to the success of a QC program. The Facilitator coordinates QC activities throughout the organization, is responsible for joint relations between the QCs and the Steering Committee and between all the QCs in operation and conducts the training programs for the QC leaders, members of the Steering Committee, and middle and top management. The Facilitator needs to be flexible and carefully selected. At different times, the Facilitator may be called upon to function as a teacher, trainer, counselor, promotor, mediator, public speaker, community liaison and internal politician. The careful selection of a Facilitator is important (this is especially emphasized by Metz, 1981a).

1.4.5 The leader

The QC leader is the immediate supervisor of the work group or a co-worker member of the QC. The QC leader is responsible for the operation of the QC, the continued training of the QC members, the encouragement of full member participation and the maintenance of member enthusiasm. There is no agreement in the literature on the question who should be the QC leader: the supervisor or a co-worker member.

A different point is one Goldstein makes on the Circle leader: 'It is doubtful whether a QC needs a leader. If the leader is a supervisor, the authority of position can stifle the generation of ideas. A convener selected from the membership (...) probably would be more effective than imposing a formal leader on the QC'.

1.4.6 The members

For all involved in QCs, but especially for QC members, the following code of conduct should be obeyed:
- each member should participate,
- criticize ideas, not persons,
- each one teach one,
- each member is free to express his or her ideas,
- each member must listen respectfully to other suggestions,
- QC work on a project is a group project,
- start QC meetings on time and end on time.

Goldstein makes some special suggestions for the organization of QC members. Membership should be changing and assertiveness should be encouraged. The size of the QC ('less than 12') depends on the needs of the situation. The work group itself should not comprise the membership of the QC on two grounds: the work group 'may be too large and, if it is not, the sentience buildup will inhibit the QC'. It is wiser to establish a single QC within a larger work group, thus allowing for periodic rotation of its membership. To conclude with Goldstein: 'If the QC system is to be effective, the membership of the circles should be circulating, heterogeneous and drawn from as wide a net work of people as possible'.

1.5 Quality Circle process and techniques

1.5.1 The process

The general problem solving process is composed of the phases identification and analysis of the problem, followed by planning, implemention and evaluation of the solution. Applying QC techniques, the following six basic activities are generally employed:

1. defining the problem,
2. collecting relevant information,
3. investigating and analyzing the data,
4. generating solutions and choosing one,
5. presentation of the findings to management,
6. implementation (not always done by QC) and evaluation of solution.

An example of how Quality Circles operate is given in exhibit 1.2 (copied from Chase, 1983):

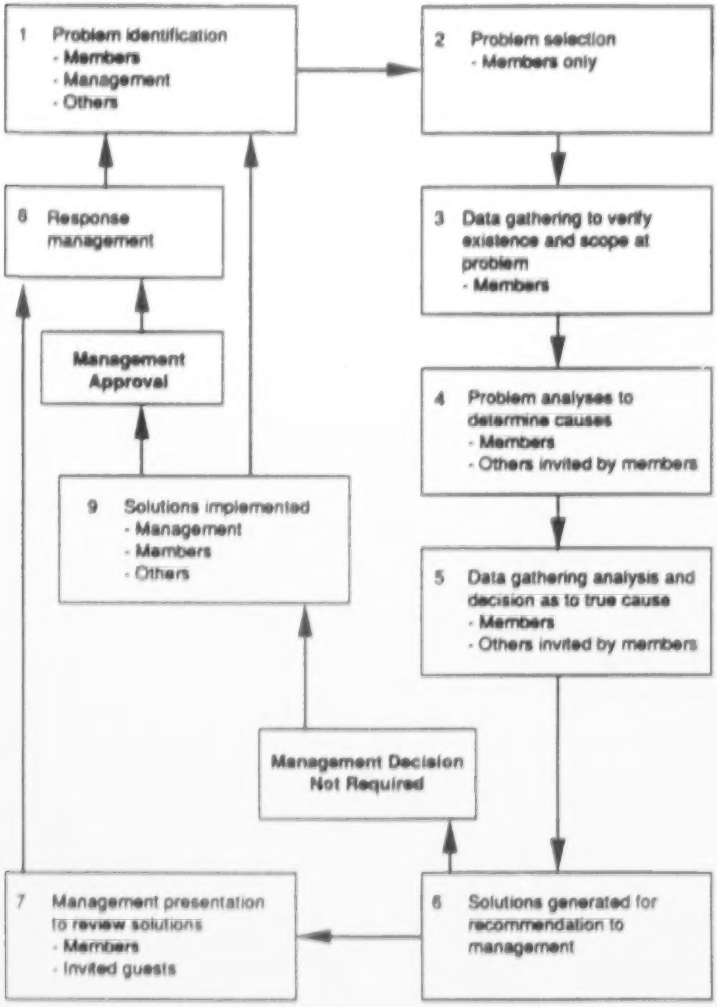

Exhibit 1.2: A Quality Circle process.

1.5.2 Techniques

During the QC-process, QCs can use a variety of techniques (Dewar, 1984; Gryna, 1981; Ingle, 1982b); Yager 1980; Martell and Tyson, 1983):

- brainstorming,
- sampling, also called data gathering, data collection,
- cause and effect diagram, also called fishbones, Ishikawa - diagram,
- Pareto analysis, also called 80 - 20 rule,
- presentation techniques,
- check sheets,
- histograms,
- control charts,
- stratification,
- scatter diagrams,
- case study.

Techniques effectively in collecting information are check sheets, Pareto, Ishikawa and other graphs, histograms, control charts and sampling. Techniques effectively in investigating and analyzing the data are brainstorming, Pareto analysis, cause and effect analysis and presentation skills. The latter, presentation skills, are most important for presenting the proposed solutions to management.

The acquisition of the techniques for use in the QC process is one of the main purposes of a QC training program. The QC training program will be dealt with in chapter 7. Information on the question what the different techniques are can be found in Ingle (1982b), Dewar (1984) and Gryna (1981).

1.6 Summary of Chapter 1

A Quality Circle is a group of less than 12 employees doing similar work who meet regularly to identify, analyze and one at a time, solve work-related problems and present proposed solutions to management. Both management and Circle could implement the solutions.

Members of the QC are usually trained in problem solving techniques and group processes. The Circle leader trains the members. Membership is voluntary (although that shouldn't be stressed) and should be circulating, heterogeneous and drawn from as wide a network of people as possible. Meeting regularly typically means one hour per week.

Kaoru Ishikawa originated the concept of Quality Control Circles in 1961 by tying together the motivation theories of Maslow, Hertzberg and McGregor and the concept of quality control taught by Deming and Juran. QCs are one of the explanations for the enormous worldwide success of Japan after World War II. QCs started to become very popular in the U.S. in the late 70's and are now used on a worldwide basis.

The structuring of QCs within an organization is as follows. Each QC has a Circle leader. A facilitator is the intermediary between QCs and the steering committee. The steering committee should include at least a few persons from higher-level management and serve as an overall guidance and support for facilitators and QCs.

Techniques typically used in the QC process are brainstorming, sampling, cause and effect diagrams, pareto analysis, presentation techniques and data displaying techniques.

2. THE AREAS OF USE FOR QUALITY CIRCLES

2.1 The problem area

Originally in the 60's QCs in Japan were used to analyze and solve quality control problems. Therefore they were called Quality Control Circles.

Later on, when the use of QCs became more advanced, they were applied to other kinds of problems. The visible evidence was the use of new terms to refer to Quality Control Circles: Quality Circles, Employee Participation Groups and Jishu Kanri ('autonomous self-management') in the Japanese steel industry are the best known examples. According to Cole (1980), the work control in Quality Control Circles has coercive tones in the U.S. which many firms prefer to avoid.

Juran (1980) calls it a myth that the QC is to be used solely to solve problems in product quality. They can be and are being used to solve problems in productivity, safety, cost reduction as well as quality. Juran also notes that it is a myth that QCs can make a major contribution to the solution of quality problems: 'the contribution can be significant but not major. Most of the company's quality problems must be solved by the managers, supervisors and professional specialists'. In relation to this Juran (1981b) found that QCs at best have a 10% share in the Japanese quality revolution. Gryna (1981) and Cole (1980) emphasize that QCs 'are not a panacea for solving worker management relations or improving quality'.

In a study in the Japanese steel industry, reported by Collard (1981), it was found that the division of QC problems over the different topics was as follows:

- costs	19.3%
- safety	19.3%
- equipment	16.6%
- quality	16 %
- efficiency	11.7%
- management	5.6%
- defects	5.4%
- other topics	6.1%

Although QCs are applied beyond quality problems, they typically are not supposed to deal with problems involving pay, working conditions, product plans and the like (e.g. Rendall, 1981).

Gryna (1981) divides problems QCs can work on in two categories:

1. Problems with the product or process. These may include quality, productivity, cost reduction, safety, process control, equipment, pollution control, etcetera.

2. Problems that create frustrations for the worker. These may be associated with the job or the environment. Main purpose is to improve the employee morale.

Where frustration problems occur, these are often experienced as 'heavy' problems. Employees feel strongly about getting the frustration problems corrected before they will work on product and process problems. In relation to especially product and process problems, Dewar (1984) states that 'when a Circle has passed the point of 'putting out fires' and starts looking ahead for ways of preventing them, it has achieved a major milestone. This is a form of quality consciousness that insures that quality will be built into the product and not 'inspected' in'. The content area of QCs will be further discussed in section 4.2, where the 'Verteam Circle' (Metz 1981b) is introduced.

2.2 The cultural area

Probably most myths about Japan deal with the Japanese culture. It is often heard that the Japanese success could never be copied by the Western world, because 'we don't have the Japanese culture'. Fortunately, authors who have been in Japan for extended periods strongly disagree with the former statement.

Cole (1980) stresses people should be careful 'not to fall victim to the myth of Japanese invincibility. The fact is that the Circles do not work very well in many Japanese companies. Even in those plants recognized as having the best operating programs, management knows that perhaps only one third of the Circles are working well, with another third borderline and

one third simply making no contribution at all'. Cole further warns that it is also often thought that few adaptations need to be made to apply the QC concept in U.S. companies and that this is certainly not the case. He suggests that U.S. companies have to adapt QCs to fit the needs of American management, workers and unions.

Juran (1980; 1981) discusses the myth of copying the Japan QC practice on details of application. Like Cole, Juran emphasizes the need to adapt the QC concept to the own culture. QCs and a people's culture should be compatible. One of the reasons for Japan's success is the fact that they made the QC concept compatible with their culture.

What appears to Juran to be common elements in all cultures:

1. There is a need to increase worker job interest and morale through participation in problem solving and decision making.

2. All workers have creativity and all can be trained to use this natural creativity in job problem solving.

3. The tools and techniques most frequently used in problem solving are very simple and easy to learn, even by workers of modest education.

Ingle's (1982b) opinion on this topic is that the philosophy of QCs is 'valid for all cultures, and a program will succeed anywhere as long as the people involved show continued determination, will power, and commitment'.

Lawler and Mohrman (1985) notice some differences between American and Japanese QC programs. First, Japanese QCs give greater emphasis to statistical quality control. Second, QC members often meet in their own time rather than during working hours. Third, in Japan all employees usually receive a financial bonus, that in flourishing times could reach 50% of the fixed salary.

Cole (in Zemke, 1980a) found six basic principles being practiced in Japanese business:

1. Trust your employees.
2. Build employee loyalty to the company.
3. Invest in training and treat employees as resources which, if cultivated, will yield economic returns to the firm.
4. Recognize employee accomplishments.
5. Decentralize decision making.
6. Regard work as a co-operative effort, with workers and managers doing the job together.

Fujita (1981), like Cole, sees an adaption of the quality concept, imported from the U.S., to the Japanese culture. Work relations in Japan are based on the following principles: life-term employment, a reward structure based on age and years of employment, unions are organized per company and the from top to bottom shared opinion that the company is a community. None of these four principles is a compulsory characteristic of a QC. Also to Goldstein (1985) and Ambler and Overholt (1982) cultural rejection is not a truly convincing explanation of QC failure.

The most convincing way to clarify the relation between QCs and the culture may be the following words, spoken by Kaoru Ishikawa (in Ingle, 1982a):

'Quality Circle activities are rapidly growing in many countries such as Taiwan, the United States, (...) and the United Kingdom. Judging from the common acceptance of the Quality Circle concept, I am convinced that Quality Circle activities have no socioeconomic or cultural limitations. Humans are human beings wherever they live, and Quality Circle activities can be disseminated and implemented anywhere in the world for human benefit'.

2.3 The organizational area

As with the cultural area, in the literature there has been found no evidence or indications that QCs cannot be used in any *type* of organization. Although QCs originally were applied in assembly or manufacturing operations, more and more banks, schools, prisons, churches, hospitals, retail stores and other non-manufacturing organizations use QCs, sometimes with

even more success than in industry (e.g. Yager, 1980; Chase, 1983; Gryna, 1981; Goldstein, 1985).

Also the size of the organization is no obstacle to the success of QCs. Yager (1980) believes that small organizations have much more to gain from using QCs than do the giant companies who started QCs in the U.S.

However, in the extensive literature reviewed on QCs in education it was found that organizations in (higher) education could be showing obstacles to the implementation of QCs (Lawson and Tubbs, 1985; Holt and Wagner, 1983; Steele et al, 1987; Aquila, 1982). More attention to QCs in education will be paid in chapter 6.

That QCs are applicable in all types of organizations is no warranty that they will work in any individual organization. Some make perfectly clear that QCs don't succeed in some individual organizations (e.g. Metz, 1981a; Steel and Shane, 1986). In chapter 4 it will be shown that the extent to which an organization is able to adapt to a QC friendly environment is the one of the most important issues for the survival of the QC movement.

2.4 Summary of chapter 2

Although QCs originally were used to solve quality control problems, they can be used and are being used to solve problems in quality, productivity, cost reduction, safety, process control, equipment, pollution control or whatever work-related problems. For many authors the most important kind of problems to solve are problems that create frustrations for the worker (also see section 3.1 on intangible results).

QCs can be used and are being used in all cultures and *types* of organizations, though they will not suit every individual organization. The secret of successful QCs is that the organization who uses them is able to adapt the QC concept to their own culture and their own organization. Even if the organization may generate some obstacles to the use of QCs, management should not be discouraged to make an effort to let the application of QCs become a success.

3. QUALITY CIRCLES: WHAT CAN BE ACCOMPLISHED?

3.1 Results that Quality Circles can yield

3.1.1 Tangible and Intangible Results

The use of QCs is not restricted to quality problems, so the results are not restricted to improvements in quality. The results of QCs have a close relationship with the objectives of QCs. The objectives show what the results (ideally) should be like.

The management of the Japanese steel industry being asked why they supported the QC activities, the main results of using QCs they saw were (Collard, 1981):

- improved notion (with workers) of problems	33 %
- improved teamwork	20 %
- improved willingness to work	18.5%
- improved work atmosphere	17.5%
- improved productivity	15 %
- mutual understanding	13.5%
- improved knowledge, skills and techniques	13 %

The above study clearly shows that the experienced improvements are primarily improvements in human functioning and mind. Improvements 'inside' the workers. This fits with Gryna's (1981) division of QC benefits into two categories: improvement of the attitude and behaviour of people at all levels of the organization and measurable savings from Circle projects. The first category is also called intangible results while the second category is called tangible results.

Many consider the intangible results QCs can yield as more important than the tangible results (Juran, 1981b; Gryna, 1981; Lawler and Mohrman, 1987; Rendall, 1981). Although most authors think that intangible results can't be measured (therefore they call them intangible), Mourey and Mansfield (1984) suggest that intangible benefits are as real and noticeable as tangibles, if you know where to look. Measures are e.g. employee turnover and absenteeism. If

these have decreased, this can be a sign of success. A closer look at some intangible and tangible results will be given below.

3.1.2 Some intangible results

Gryna (1981) made a clear analysis of the possible intangible benefits of QCs. He makes a difference between QCs' effects on individuals' characteristics, on individuals' relations with others and on workers and their attitudes toward the company. These intangible results show the motivation theories of Maslow, Hertzberg and McGregor that underlie the QC-concept. The transfer of intangible results can be increased by a rotating membership of the QC. Most intangible results only work for the QC members. Tangible results on the contrary mostly work for everybody in the work area.

Effects on individuals' characteristics are:

- Circles enable the individual to improve personal capabilities
- Circles increase the individuals' self-respect
- Circles help workers change certain personality characteristics
- Circles help workers develop the potential to become the supervisors of the future.

Effects on individuals' relations with others are:

- Circles increase the respect of the supervisor for the workers
- Circles increase the workers' understanding of the difficulties faced by supervisors
- Circles increase management's respect for workers

Effects on workers and their attitudes towards the company are:

- Circles change some workers' negative attitudes
- Circles reduce conflict stemming from the working environment
- Circles help workers to understand better the reasons why many problems cannot be solved quickly
- Circles involve workers more actively in their jobs
- Circles instill in the workers a better understanding of the importance of product quality.

Goldstein (1985) found that QCs were claimed to have:

- raised level of employee morale
- increased employee motivation and job satisfaction
- improved communication
- changed the emphasis in problem solving from fire fighting to prevention
- enhanced the commitment to job and organization and problems in e.g. quality, safety and waste
- reduced the reliance on authority to get things done
- developed people
- trained leaders and supervisors
- introduced an orientation to learning
- enhanced the coordination of work
- reduced vertical and horizontal demarcations over ownership of problems
- developed into strong co-operative teams.

3.1.3 Some tangible results

There are numerous tangible results QCs yield. The most important categories are: (e.g. Goldstein, 1985; Ingle, 1982):

- improved quality,
- improved productivity,
- enhanced safety,
- reduced costs,
- reduced waste,
- reduced delivery times.

Tangible results mostly work for everybody in the work area, not only for QC members.

3.1.4 Evaluation of results

A special comment needs to be made about the benefits QCs in the literature are claimed to be yielding. Many authors claim a savings to cost ratio of 6 to 10 divided by one or even more (e.g. Yager, 1980). Fact is that there are numerous examples of cost savings up tens of thousands of dollars a year (e.g. Gryna, 1981; P.C. Thompson, 1982), but these successful examples make-up only a small part of all implemented QCs. White and Bednar (1984) found in two more broadly-based surveys savings to cost ratios of less than one to one in 70 percent of the responding companies.

More authors stress that it is dangerous to believe that QCs guarantee success or that they are a panacea for solving problems (Metz, 1981a; Cole, 1980; Juran, 1980; Gryna, 1981; Ingle, 1982). Goldstein (1985) refers to this problem as QCs claimed to be 'jacks-of-all-trades' and 'masters of none'. An evaluation on the resuls of QCs, both tangible and (supposed to be) intangible, measured in broad range of organizations, has not been found in the literature. The largest part of the information restricts to case studies of individual organizations, mostly successful ones. This one-sidedness of the reviewed literature might be a cause to the exaggerated expectations that many organizations have regarding the implementation of QCs.

3.2 Factors leading to success or failure

In the literature, dozens of factors leading to the success or failure of implementing QCs into an organization have been found. Among the more extensive descriptions of these factors are Yager (1981), W. Thompson (1982), Gryna (1981), Patil, Salitore and Brady (1987) and Juran (1980). However, the descriptions covering the whole array of factors best were found to be in Ingle (1982a, 1982b) and Metz (1981a).

Metz examines four key factors which determine the difference between success or failure:

1. Not assessing managerial and organizational readiness of QCs.
2. Not doing adequate start-up and implementation planning
3. Not exercising care in the selection of the facilitator.

4. Not recognizing the organization development implications of QCs (i.e. implementing QCs also means implementing more participative principles).

For Ingle it is most important that everybody in the company understands the principles thoroughly and implements them properly. Ways to achieve success include: (based on Ingle, 1982a, 1982b):

- establish a suitable atmosphere for the program
- obtain commitment from top management
- select the right people and the right area for implementation
- select objectives for the QC program
- expose people to the QC program

- inform and communicate about the QC progress
- keep the program voluntary
- use a proper training program; it's crucial
- start slow and let it grow slowly
- be open and positive

- monitor QC progress and changes
- have a clear and open implementation policy
- give proper feedback on QC recommendations and do it quickly and don't be hard on QCs
- be sure of middle management support
- involve union and union members from the beginning (seems to be more important in the U.S.)

- give recognition to QC members
- keep the QC philosophy present that QCs can work in every culture, type of organization and for all people
- avoid presenting the idea that QCs are a panacea, discourage high expectations
- provide sufficient financial support
- don't mix QCs with other, likewise, programs

- make clear that joining a QC means hard working; a QC meeting is not a tea and chat hour
- don't replace 'theory Y' managers with 'theory X' managers
- conduct extensive research and planning before implementing QCs
- provide a well built QC organization, select Circle leaders and facilitators carefully.

The above is a virtually comprehensive list of factors leading to success or failure of QC implementation. It is doubtful, however, if an individual organization will be capable with handling all the factors listed. Probably it isn't absolutely necessary to qualify for the whole list. Point is that the following factors can be considered to be the key factors for success:

1. Top management and middle management must agree to support, encourage and listen to QC activities and do whatever needs to be done to make QCs successful.

2. Training should be given to everyone involved in the QCs, from top to bottom; carefully select the persons that are to be trained for a specific QC function.

3. Plan extensively in advance and proceed slowly, even after start-up.

4. Inform everybody within the organization continuously about the QC program and process so that everybody would be able to oversee the implications QC activities can bear on the rest of the organization. How important proceeding slowly is to the Japanese has been perfectly written down by Juran (1980).

Apart from the factors, attention should be paid to some articles that make a useful contribution to what has been stated above. First, W. Thompson (1982) suggests an extensive list on organization readiness indicators. Second, Ambler and Overholt (1982) use a Compatibility Quotient to measure the organizational fit for QC use. Surprisingly to them it turns out that organizations can fit for QC use too well, meaning that they already work according to the QC concept and philosophy and thus don't need QCs anymore. Third, Pati, Salitore and Brady (1987) pose that an organization that fails to use QCs successfully can start again if they yet make the organization ready for it and conduct a heavy training. They further show a systematic strategy to introduce an 'involvement effort' (meaning QCs). Worth reproducing here is their comment on the implementation of QCs: 'Ironically, for the success of the program's bottom-up philosophy, it has to start from the top'. Finally, Lawler and Mohrman

(1985) related QC 'destructive forces' to phases in the QC life-cycle. This relationship is reproduced in section 4.1.1.

3.3 Evaluation of Quality Circles

A study by Kirby and Holoviak (1985), oriented at QC evaluation in a survey of 55 companies, showed that (on the basis of 88 reponses) only 22% attempted to measure any changes in productivity or job quality. Gryna (1981) noted that most evaluations that are conducted are of an informal nature. He recommends QC evaluations should be formal. It is stressed by many authors that very little information on QC evaluation is available (even though in this section referenced authors do).

The first question that should be answered in this regard is the desirability of evaluation at all. Many Japanese companies don't conduct a single measure, because their management believes that QCs are contributing in such extent, that they are not interested in measuring their results. They 'sense' the QC effectiveness in their company. Greenbaum, Kaplan and Metlay (1988) try to answer the evaluation desirability by balancing reasons against and reasons for evaluation. Their conclusion is that evaluation should be organized because it is essential to the survival and improvement of QC programs.

Contrary to a lot of managers and consultants, authors of scientific articles on QCs agree on the lack of research in relation to the evaluation of QCs. There is a plea for more and better research (e.g. Bank and Wilpert, 1983; Wood, Hull and Azumi, 1983; Ramsing and Blair, 1982 and nearly all in this section referenced authors).

White and Bednar (1984) in their review of over 250 articles found only five multi-organizational studies that examined the impact of QCs and two of these were based on 'extremely small samples'.

The problem with the literature on QC evaluation is that most of the very few articles that exist deal with evaluation within an individual organization or even within a single QC. The largest part contains case studies (without empirical data). Empirical research studies are hard to find. All in all, even the empirical research on QC evaluation doesn't seem to be sound. Steel and

Shane (1986) reviewed the research literature on QCs. They found this literature to be 'woefully inadequate'. The majority of the reviewed studies showed severe methodological deficiencies. Still they were positive towards the more recent literature and some sound studies were identified.

Imberman (1982) observed that the four most likely reasons for failure were: poor employee morale, poor supervisor training, poor management persuasive techniques and indifferent management.

Cole and Tachiki (1984), apart from other findings, found that the spread of QCs was hindered by middle management resistance and lack of top management support, employee resistance or apathy presented problems during implementation.

White and Bednar (1984) report that relevant problems within the QC system are effectively staffing and training participants at all levels of the program. Other problems that were outside the QC system and more frequently, are lack of support from management, jealous feelings toward QC members and poor integration of QCs into the overall organization.

Because a thorough discussion of the (scientifical) problems in the evaluation of QCs would go far beyond the scope of this report, the rest of this section will be restricted to two topics. First, an overview will be presented of how a single QC can be measured on its activities. Second, four 'champion' studies, based on sound empirical research, will be discussed and some other studies that honestly seem to be sound as well will be referred to. Thus a small literature base on sound evaluation of QCs will be provided to make a follow-up on this topic more promising.

Ingle (1982b) reports 15 measurements that could be used to evaluate QC activities:

1. Quality improvements (percentage reduction in rejects, defective products and rework)
2. Participation (number of QCs and QC members)
3. Cost reduction
4. Waste reduction.
5. Machine utilization (occupation rate).
6. Safety (number of accidents per 1000 working hours).
7. Productivity.

8. Machine maintenance.
9. Communication.
10. Attitude (Honeywell for example uses a questionnaire).
11. Product improvement
12. Customer satisfaction.
13. Absenteeism.
14. Grievances.
15. Work satisfaction.

There are four comprehensive longitudinal studies of the QC process and outcomes. All four used non-equivalent control group designs and are found to be sound according to methodological requiremnts. A more detailed discussion on these four studies can be found in Steel and Shane (1986) and Steel and Lloyd (1988). The four studies will be shortly discussed below.

Atwater and Sander (1984) reported the results of an investigation of the outcomes of the QC process. They found no significant effects on attitudinal or behavoral indices (like sick leave usage or suggestions) during an eight-month period, comprising a sample of 331 employees.

Steel et al (1985) discussed the outcomes of a QC evaluation in two organizations. Analysis of covariance on the data for the one organization showed significant QC effects on 7 of 20 survey variables. No significant differences between QC participants and control group members were observed in the other ocganization.

Marks et al (1986) found significant differences in attitudes in favour of the QC participants. They also observed dramatic gains in measures of production and efficiency, coupled with reductions in absenteeism were posted by the QC participants.

Steel and Lloyd (1988) observed QC participation to have significant effects on cognitive measures of sense of competence and interpersonal trust and on some measures related to properties of the task environment (e.g. goal conquence). QC participants reported significantly greater attachment to the organization as the study progressed which relates to decreased levels of employee withdrawal.

Apart from the above four sound articles, more information on empirical research on the evaluation of the QC process that gives a sound impression can be found in Hull, Azumi and Wharton (1988), Wood, Hull and Azumi (1983), Griffin (1988), Ferris and Wagner (1985), Steel and Shane (1986), Rafaeli (1985), Barrick and Alexander (1987), Tang et al (1986, 1987a, 1987b), Greenbaum, Kaplan and Metlay (1988) and Cole and Tachiki (1984). All these articles have been studied, but discussing would go beyond the scope of this report. For a more thorough analysis on this subject, Steel and Shane (1986) and Steel and Lloyd (1988) would be excellent to start with.

3.4 Summary chapter 3

The most important benefits QCs can yield are improved employee morale, quality and productivity. In general, intangible results are of more importance than tangible ones. Although numerous benefits of QCs have been claimed, it is doubtful whether QCs can do more than yield just some of them.

The key factors that determine success or failure of QC implementation are:

1. (Not) assessing managerial and organizational readiness for QCs.
2. (Not) doing adequate start-up and implementation planning.
3. (Not) exercising care in the selection of the facilitator.
4. (Not) recognizing the organization development implications of QCs.

These four factors seem to be among the major causes why QCs fail. Some articles in the literature found especially management support to be an essential requirement for QC success.

The literature on the evaluation of the QC process in general shows methodological deficiencies. There are only a few articles that are sound. The rest mainly deals with QC evaluation within a single organization or within a single QC and is no more than a case study instead of being an empirical research study. Therefore there is a plea for more and better

research, which is necessary for the survival and improvement of the QC movement. It cannot be said that the very few sound empirical research studies present a case in favour of the use of QCs within organizations.

4. THE FUTURE OF QUALITY CIRCLES

4.1 Quality Circles: fad or custom?

4.1.1 The Quality Circle life-cycle

A common characteristic of many management theories is that they are fashionable phenomena: they come fast and often they go fast as well (Hulshof, 1987). In section 1.2.2 the growth figures of QCs suggest that QCs can be a fashionable manage-ment theory, otherwise called a fad. Before answering the question if QCs are not more than just a fad, if they are that at all, attention will be given to the life-cycle of a QC.

Lawler and Mohrman (1985) report that QCs, like virtually any planned organizational change effort, go through a series of stages in their growth. Each phase contains its own key activities as well as its own threats to the program. The time it takes to go through each phase varies, but almost without exception every QC program that was studied by Lawler and Mohrman and survives the threats of the first stage moves into the second stage and so forth. QCs rarely skip stages or become stuck at one or another. Exhibit 4.1 shows the phases of a QCs life (copied from Lawler and Mohrman, 1985).

What makes this life-cycle so important is the comments Lawler and Mohrman generate on the decline phase. In their experience few QC programs turn into other kinds of programs (see section 4.1.2 and 4.2). The main reason most groups continue at all is because of the social satisfaction and pleasure the members experience rather than the groups' problem solving effecti-veness. Management then cuts back on the resources: the spiral down effect begins. Lawler and Mohrman are pessimistic about the existence of QCs. To them QCs are 'an unstable organizational structure that is likely to self-destruct'. However, 'this doesn't mean that management should avoid them'.

Phase	Activity	Destructive forces
Start-up	Publicize	Low volunteer rate
	Obtain funds and volunteers	Inadequate funding
	Train	Inability to learn group-process and problem-solving skills
Initial problem solving	Identify and solve problems	Disagreement on problems
		Lack of knowledge of operations
Approval of initial suggestions	Present and have initial suggestions accepted	Resistance by staff groups and middle management
		Poor presentation and suggestions because of limited knowledge
Implementation	Relevant groups act on suggestions	Prohibitive costs
		Resistance by groups that must implement
Expansion of problem solving	Form new groups	Member-nonmember conflict
	Old groups continue	Raised aspirations
		Lack of problems
		Expense of parallel organization
		Savings not realized
		Rewards wanted
Decline	Fewer groups meet	Cynicism about program
		Burnout

Exhibit 4.1: Phases of a Quality Circle life-cycle

It is striking that Comstock and Swartz, both QC facilitators, define nine developmental stages in the evolution of a QC, although somewhat different from Lawler and Mohrman and that stage 9 is called 'discorporation'. The QC is then discontinued. In this case, management should attend a final meeting where formal recognition is given to every member of the QC (Comstock and Swartz, 1980).

Lawler and Mohrman (1987) later described the QC life-cycle from a somewhat different point of view. The essence remained the same. Both Lawler and Mohrman and Comstock and Swartz make very clear that a single QC is like a human life: a person is born, matures, declines and eventually dies. However, like some people believe that there is life after death,

Lawler and Mohrman (1987) think QCs can be an important first step towards organizational effectiveness through employee involvement. Attention to this will be given in section 4.2.

4.1.2 The QC movement: the literature before 1984

The worldwide tremendous growth of the QC movement in the early 80's has lead to the question if the QC movement is just a 'management fad' or a serious and useful contribution to the improvement of organizations. That at least in the U.S. QCs are a fad is obvious. In a few years, between 1979 and 1984, thousands of American companies started using QCs. The result of the massive implementation of the QC concept has been disappointing. As early as 1982, Imberman reported that 28 out of 40 observed U.S. companies saw their QC program fail because they were ended without succesful improvements. Ambler and Overholt (1982) also note a failure rate of over 50%.

It seems to be that the authors most experienced with the QC concept, in the early 80's, were somewhat afraid of the QC movement to become overheated. Cole (1980) at that time didn't know the answer yet on the question if QCs are just another fad or that they will have a lasting impact. Juran (1980) calls it a myth that the QC in the only way ever invented to make use of the education, experience and creativity of the worker. The 'craftsmanship concept' has, to Juran, existed for centuries, even during the Taylor period participation of the worker had been accomplished, e.g. by the Scanlon plan. After observing an over-selling of the QC concept, Metz (1981a) notes that this 'really makes me nervous'. He thinks the tremendously rapid growth of interest in QCs is a very real danger. It appears to him that as a consequence, QCs are already becoming a fad (in that time).

Virtually all authors agree on the notice that QCs around 1980 could be considered a management fad, but that this state of being a fad was caused by thousands of consultants, writers and organizations having unrealistic expectations about the QC concept, thus not realizing this concept is not as simple as it might look like.

Metz (1981a, 1981b) therefore stresses that QC failure doesn't have to happen if the program is carefully planned and implemented into a supportive organization. Unless QCs have adaptability and can evolve to help managers meet new challenges, chances are they won't survive (according to Metz). A year later, he concludes that it is a 'sad reality' that the

necessary organizational readiness in most cases was not provided for or that it was done superficially.

Wayne, Griffin and Bateman (1986) and Zemke (1980b) have an explanation for the overrated expectations of QCs many had: it is the fact that there are few reports of QC failure. Most articles only deal with (very) successful case studies.

Ishikawa, the father of the QC concept, is pessimistic about the survival of the QC movement in the West. To him, QCs are a real fad and they won't survive because of what he believes to be a lack of any deep commitment to quality by top management. QCs should not be seen as a panacea for all quality problems. QCs only succeed within the concept of company-wide quality control (Arbose, 1982). It is useful, in the light of this, to know that Rendall (1981) expects QCs to be lasting for very long because the Western society is evolving into a new civilization wherein workers will be seeking more responsibility and will have work that fully utilizes their talents. QCs would go well with this 'Third Wave' trend.

From this 'pre 1984' literature we still don't know if the QC movement will survive. We do know that QCs are a fad, but we don't know yet if QCs will turn out to be more than a fad. The pre 1984 literature on the fad problem has been discussed because it shows perfectly the final answer on the fad question. Many QCs fail not because the QC concept isn't sound, but because a woeful lot of organizations, consultants and writers haven't been listening properly to authors like Juran, Cole and Metz. Signals for QC failure and ways to prevent that can be found in the literature before the QC concept became a fad. It is therefore not surprising that the post 1984 literature on QCs as a whole is completely different from the pre 1984 literature as a whole. This crucial topic to the survival of the QC movement will be discussed in section 4.3.

4.2 Quality Circles: literature after 1984

4.2.1 Three types of fads and three alternative solutions to Quality Circles

The more recent literature is very clear on the future of the QC movement. However, before some recent articles will be discussed, attention will be paid to the life cycles of management fads in general. Huishof (1987) distinguishes three possible life cycles for three types of fads:

- the real fad, which is characterized by: fast come, short bloom, fast go
- fad with a tail, characterized by: fast come, short bloom, fast go but not completely; on a limited scale the fad lives on
- fad with an adapted tail, characterized by: fast come, short bloom, fast go but although it disappears from the stage it later returns, often integrated with a new fad or custom.

QCs certainly are not a real fad. There are still many companies using QCs in their organization (e.g. the U.S. Army, Dutch Volvo), so the QC movement can be characterized as a fad with a tail. The following articles to be discussed suggest that this tail might transfer into alternative solutions.

These alternatives can be divided into three groups:

- the QC dies
- the QC will be used for other purposes and/or problems
- the QC transforms into another or broader kind of participative management or organizational development.

Since the dying of QCs has been discussed earlier, the attention will be paid to the other alternatives.

4.2.2 Alternative solutions for Quality Circles

Gryna (1981) experienced with the companies he visited that QCs alone cannot be expected to achieve the results of a participative management style. QCs are most likely to succeed in organizations that already have other forms of participative management. One example is the Scanlon Plan, which Lawler and Mohrman (1985) think has more power than QCs. Also Simmons (1985a, 1985b) and Sims and Dean (1985) note the importance of a participative environment to let QCs be successful.

These authors, together with Lawler and Mohrman (1985, 1987), give extensive descriptions of directions QCs could evolve to. In general QCs are advised to evolve into participative management. An excellent detailed discussion can be found in Lawler and Mohrman (1985) and (1987). Elvins (1985) observed that half of the QCs indeed transform into participative management. Steel and Shane (1986) note that lessons learned by practitioners of organizational development may provide guidance on the successful implementation of QC programs.

Of real importance is an article Metz wrote in 1981. As early as then he foresaw that QCs in the future wouldn't be solving the right problems. Metz (1981b), therefore, suggests a 'Verteam Circle'. While the basic QC has a horizontal design, the Verteam Circle has a vertical one. QCs are suitable for problems over which QC members have control or have limited control and which require the influence of an outside party. But by far most problems are problems over which QC members neither have control nor influence. Therefore, Verteam Circles should be implemented to solve the latter problems.

Although this short overview of QC alternatives may be confusing, the idea that's behind them is clear. QCs are the embodiment of a philosophy, a way of life, a way of running a business. As a result, not all organizations are ready to implement QCs. Special management skills and philosophies must be present before QCs can be successfully implemented. The organization must be convinced that the key to productivity lies in its people and that their commitment, involvement, participation, support, or whatever (maybe even self-management) are the keys to making the QC concept work. (adapted from Zemke, 1980a).

Ferris and Wagner (1985) agree on all of this, but they are not that positive concerning the U.S. management. Because in reality U.S. firms lack other participative managerial techniques, the expectation for QC success in the U.S. should not be taken for granted. The typical American individualism may be a serious obstacle to the application of the QC concept. The reason for the lasting Japanese success is, according to Ferris and Wagner, the Japanese collectivism and the range of participative managerial techniques they use for managing.

The transition from QCs to a wider application of participative management also presents an obstacle that can be considered an inherent weakness of QCs: QCs are supposed to create within an organization a more participative environment, but they only seem to work well in organizations that already have a participative environment! It follows from this that most (not all!) QCs will end up in a negative or positive vicious circle: QCs within a non participative organization don't work and because they don't work they don't contribute to a more 'participative' organization; QCs within a participative organization work and because they work they contribute to a more participative organization, that makes QCs make work better and so forth. Thus QCs are not participation contributors, as they are claimed to be, but participation reinforcers.

Attention must be paid to that the above doesn't mean QCs are creating a participative organization. They only are claimed to generate benefits that are part of a participative organization. And that they seem only be able to do that within an already more or less participative environment (that doesn't necessarily have to be partipative on the aspects QCs can make a contribution).

What in the light of this discussion perhaps is most important is the short-term directedness of American managers in contrast with the long-term directedness of Japanese managers. Americans tend to be aiming at money savings within a few months, while the Japanese are aimed at harmonious continuation of business in the long run (also see e.g. Ferris and Wagner, 1985; Juran, 1981).

4.3 A shift in the literature on Quality Circles

A review of literature on QCs in 1989 is considerably different from a review of literature on QCs in 1981. This difference can be observed best in the quality and subject matter of the literature. In the literature before, say 1984, a minor part deals with the scientific validity of the QC concept. Most publications are critiqueless euphoric about the QC concept or present critique, but that critique is mostly based on experience in one company or even one QC. In that time there hardly was any sound and useful critique on the QC concept. Of course exceptions do exist.

The heritage of this pre-1984 literature seems to be two-sided. First, there are a number of QC 'handbooks' that in 1989 are still useful to get a clear and thorough impression on the field of QCs. Examples of these 'handbooks' are Gryna (1981), Gibson (1982), Ingle (1982) and last but not least Amsden and Amsden (1976).

Second, there are some authors whose articles are surprisingly up-to-date after all these years. Especially what has been published by Edmund J. Metz; Joseph M. Juran and Robert E. Cole seems to be still fruitful in 1989. These authors foresaw the direction the QC movement would go to and what were and are the key weaknesses of this movement. Looking back now, these authors have been expressing the right warnings to which the majority in the field wouldn't listen to and relate to the causes of the large scale failures of QC implementation in practice, in the U.S.

All in all, the pre-1984 literature on QCs as a whole has not contributed much to a better understanding of the QC concept to be applied in the West, on a theoretical sound base.

The literature after 1984, obviously a turning point in the popularity of the QC movement, is of a different level of quantity and quality. A thorough literature search effort had to be made to discover more recent articles. Publications in the form of books published after 1984 were even not found at all.

Virtually all post-1984 literature deals with topics such as 'locating problems with Quality Circles' (White and Bednar, 1984), a 'conceptual re-evaluation' of QCs (Ferris and Wagner, 1985), what QCs can contribute to organization after the fad and after the honeymoon (Lawler

and Mohrman, 1985, 1987) and what can be found 'beyond Quality Circles' (e.g. Sims and Dean, 1985). Attempts are further made to place the QC concept in a theoretical framework (Goldstein, 1985) and to build a sound empirical research base (e.g. Steel and Shane, 1986; Steel and Lloyd, 1988).

Of course the literature reviewed in this report does not comprise the literature that exists on QCs. However, it appears that the sample that has been used for this report is a fairly representative sample.

Considering what has been stated above, the conclusion is that the more recent literature (as a whole) on the QC concept is of less quantity but of far better quality than the literature in the days the QC movement was most popular. A theoretical and empirically sound base of the QC concept is starting to develop. It is, based on reviewing the literature sample, only a shame that the QC movement doesn't seem to be 'in the picture' than say 5 or 10 years ago. Figures on the current use of QCs in the West were not found, so a definite statement on the 1989 popularity of the QC movement cannot be made.

Because of the above discussed shift in the literature, it turns out to be a very wise decision to write part I of this report. It may be seen as an up-to-date contribution to literature reviews on the QC concept. The importance of writing part I of this report lies in part II. Without having been reviewing the more recent literature, the content of part II of this report would have become quite different. It would have become a too optimistic view on the possibilities for QCs in training and development, missing the notice of the lack of a sound theoretical base.

4.4 Definite statement on Quality Circles

Credit should go to the people earning that credit. Therefore, part I of this report will conclude with two quotations that virtually make up a comprehensive literature review on the QC concept. Apart from these two quotations it should be noted that QCs generally can only be successful in a participative environment. An organization practicing participative management cannot be created by QCs alone, though QCs are sometimes claimed to be. QCs can but reinforce a participative environment. Next to QCs, there are many other management programs or philosophies that also contribute to a more participative organization.

Edmund J. Metz (1982) was one of the first to recognize that successful QC implementation is not as easy as it looked like to many:

'We are still in the honeymoon phase with Quality Circles in the United States. The movement, still relatively new, is maturing quickly. For those organizations which have been involved with Quality Circles for the past few years, it has become evident that it takes more work, skill and management support than was initially perceived to have an effective program. The same reality appears to exist regarding the training of managers, leaders, members and facilitators. Training is vital and should be planned as an integral and ongoing process to help improve the skill levels of managers, leaders and facilitators and the long-term health and effectiveness of Quality Circles.'

Lawler and Mohrman (1987) are the only authors in the reviewed literature who observed that the key problem for QC implementation in the West is the question how well traditional management approaches can coexist with QCs:

'Quality Circles are potentially useful in helping move an organization toward greater effectiveness. Their orientation and structures are consistent with a participative approach to management; as such, they pose the following challenge to traditional management approaches: How well can traditional approaches coexist with Quality Circles? Our view is that, in the long term, Quality Circles have trouble existing with traditional management approaches; under such conditions, they either fade or require changes in major features of the organization. There is no road map for the use of Quality Circles. However, some of their strengths and weaknesses suggest that organizations should think carefully before choosing them as an approach to participative management. In most cases, it may be best to transition them to another form of co-operative program.'

What should be added to this conclusion of Lawler and Mohrman is that QCs don't work and don't have to work for all organizations and all employees. Some organizations are just not suited for QCs and they shouldn't use them. Also, some employees want to work alone and don't like to be involved in group work and group decision making. Those workers should not be forced or even stimulated to join a QC.

5. SOME EXPLORATIONS OF QUALITY CIRCLES IN TRAINING AND EDUCATION

5.1 Questions for investigation

In chapter 4 it was concluded that QCs are still a promising tool for organizations to improve their performance. The essential requirement for the success of QCs is the qualification for the managerial and organizational readiness. It takes more work, skill and management support than was initially perceived to have an effective QC program. The same reality appears to exist regarding the training of managers, leaders, members and facilitators. Training is vital and should be planned as an integral and ongoing process to help improve the skill levels of managers, leaders and facilitators and the long term health and effectiveness of QCs. These were the words of Edmund J. Metz.

Since training is such an important aspect of QC application, it is surprising to find that there is hardly any literature dealing specifically with the training aspects of QCs. All the more surprising because training is one of the key factors for QC success. The question can be raised which possibilities QCs might offer to a training department (TD) of an organization. With training department is meant that part of a work organization (i.e. all organizations except for schools, colleges, universities and other educational organizations) that is responsible for the training and development of the human resources within that organization.

Four functions for a TD can be identified respectively:

1. TD as trainer (of QC participants).
2. TD as user (of a QC).
3. TD as responder (to training needs generated by QCs).
4. TD as administrator (of QCs for trainees).

In section 2.3 it was found that indications exist that the education area might present some obstacles when QCs are implemented. Because a TD and an educational organization are to some extent familiar, the question might be raised if these obstacles exist and in the case the answer is yes, if these obstacles apply for a TD as well.

The questions for investigation are thus as follows:

1.a. Are there education specific obstacles to the implementation of QCs?

b. What do these obstacles look like?

c. To what extent would these obstacles also occur in the area of training and development?

2.a. What is known in the literature about the training for QC use?

b. To what extent can QCs be a useful contribution or improvement of the performance of a training department, respectively in the role of trainer, user, responder and administrator?

5.2 Quality Circle use in education

5.2.1 Education specific factors inhibiting the use of Quality Circles

The literature reviewed on QCs in education only provides a handful of articles, useful in relation to the questions for investigation. Virtually all publications comprise a case study of QC implementation in a community college or university, or comprise a general story about the use of QCs in education, without considering the education specific factors that could influence the success of QC implementation in an educational organization. As a whole, the literature on QCs in education doesn't seem to be as sound as the general literature on QCs, reviewed in part I of this report. Chase (1983), Nichols (1982), Steele et al (1987), Holt and Wagner (1983) and to a less extent Aquila (1982) and Lawson and Tubbs (1985).

The most important article on education specific factors inhibiting the use of QCs in education was written by Nichols (1982). This article has been frequently used and referred to (e.g. Lawson and Tubbs, 1985; Holt and Wagner, 1983). Nichols presents five obstacles for the implementation of QCs in higher education:

1. Although American higher-education management appears to be highly participatory, it is not. What is seen as democratic management actually is disorganization. Institutions having genuine participative management are rare. For most institutions, the lack of participative management is a major contributor to the faculty-administration split.

2. There is a lack of participative-leadership models. There seem to be either indecisive leaders or business-like bosses who are paid to make the tough, quick decisions. The latter type of leader is the most frequent one and killing the opportunity to implement Theory Z.

3. Although hardly anyone makes more use of committees than colleges and universities, group decision making is not a custom in higher education. Decision by majority vote is the pattern, but a higher goal and central to the QC ideal is group agreement in which everybody is a winner because each has had a voice in the decision.

4. In higher education there is confusion over who is responsible for quality control. Most faculty members prefer that the individual professor has the responsibility. 'Academic departments are not usually set up to be Quality Circles. They tend to represent vested interests of faculty disciplines rather than the educational product delivered to students. Therefore, they usually function as advocates for competing interests rather than as advocates for quality.'

5. The greatest obstacle is the problem of 'product'. In industry, a worker can see and touch his product. It can be tested for quality. That is not so easy in higher education, especially because there is no agreement on what the product looks like: 'The product of education must be defined. Only then can specific components be identified that can yield to quality control. Only then can an academic QC work.'

Nichols ends with a strong conclusion: 'Academe is not so different from the business world. Our product, and therefore our management, needs improvement. With the most educated work force of any industry we should set the example in participatory management. Given our historic commitment to excellence, we have no excuse if we fail to develop an educational equivalent of the Quality Circle.'

Chase notes that industry and education share one attribute: the public distrusts the quality of their products. Both are perceived as not as good as they used to be.

Steel et al present some issues relevant to implementing QC programs.

1. The QC materials use terminology and examples from the business setting. This must be translated for use in education.

2. A QC typically involves people from the same work area. Few student service units, however, have enough people performing similar functions. Therefore the tendency is to form QCs across functional areas. Significant skills are required to do that.

3. In business and industry, management can see tangible benefits QCs present to them. These tangible savings are direct and visible improvements for a company and it reinforces management support of QCs. In higher education the benefits from QC efforts must be appreciated from a broader institutional perspective. Managers in higher education could give more emphasis to benefits such as providing a better service.

Holt and Wagner provide the most compact statement on the differences between industry and education:

'In considering a Quality Circle program, university and college administrators must recognize the differences between private industry and institutions of higher education. A college or university is not product or service-for-profit oriented. The teaching, service and research missions of most schools is difficult to measure as a tangible product. Employee group diversity is another important difference. Faculty, administrators and staff on a campus have very different roles and duties. Few employees in industry, for example, enjoy the independence and self-direction of faculty members. Further, many campuses have a strong tradition of faculty governance. Faculties are directly involved in determining institutional goals and priorities, setting policy and determining the academic, research and service mission of an institution.'

All in all it can be concluded that there is very little literature that investigates what makes education special in relation to QCs. However, what can be learned from the few reviewed articles is that in general educational organizations are somewhat different from organizations in business and industry. That, of course, is not surprising! As much difference as there is between industrial organizations, there is a difference between educational organizations. There seems to be no reason why QCs cannot be implemented in an educational organization. Like in business and industry, there will be individual organizations that are not suited for QCs, but in general QCs can be implemented in the field of education as well.

Not all obstacles noticed for higher education are equally strong. That in education there are no tangible benefits for QCs is not as simple as it seems to be. There are tangible benefits of QCs possible, e.g. money saving on materials, maintenance, etc. Intangible benefits can be measured as well, e.g. absenteeism, drop-out rates. Above all: intangible results are a more promising side of QCs than tangible results.

That there are few people from the same work area shouldn't be that much of a problem. More than that, the Verteam Circle introduced by Metz (1981b) seems to be very promising to the education setting and overcomes the obstacle of not having a homogenous work group.

That QC materials should be translated to the field of education and that they are currently not can also be read as: 'we have to do a job that we still haven't been doing but should have done already'. The non-existence of education directed materials doesn't seem to be a valid excuse of not implementing QCs in education.

All in all, this report will present a total agreement with Nichols. There are differences between industry and education, but these differences are solvable if management in education really wants to have them solved. What industry and education have in common (in the U.S., like with the differences) is a public distrust of the quality of their 'products'. Therefore, Nichols concludes with: 'we have no excuse if we fail to develop an educational equivalent of the Quality Circle'. Again, a plea for more and better research should be mentioned. Although theoretically there are hardly reasons why QCs cannot be implemented in educational organizations, in practice there seems to be a long way to go before QCs can be an overall success in the education setting.

5.2.2 Transfer of education specific factors to training

A training department (TD) of a company can be considered as 'just another part of the organization' as well as 'an educational island within the organization'. Most TDs will be an inbetween kind of these two extremes. In other words, TDs are somewhat like business units and somewhat like educational organizations.

The question is to what extent the situation, presented in the previous section, is transferable to a TD. From what has been concluded in the previous section, it can be said that this question doesn't really matter. The obstacles were not unsolvable and shouldn't cause any serious problems in training and development as well. Apart from that, typical TDs do not exist. The variety in TDs seems to be larger than the variety in, say colleges or universities. TDs are part of a wider organization and thus influenced by the culture, rules and traditions of that organization. In fact, we don't know how TDs as a whole look like. No study is known that gives an overview of TDs within business and industry. Therefore it is impossible to present any valid assumption regarding the use of QCs in TDs compared to the use in educational organizations.

5.3 Quality Circles and training

5.3.1 Training for Quality Circles

The importance of training

Proper training is one of the keys to QC success. This is stressed by many authors and it is not a point for discussion. More in detail, everyone in the organization involved in QCs should be trained : the Steering Committee, the Coordinator, the Facilitators, the QC leaders and the QC members. Everyone else not directly involved should be informed about the QC concept so that everybody in the organization at least is knowledgeable about the QC program.

A company may develop its own training program or use the services from consultants or training companies outside the organization. A consultant should be one having credentials and a lot of experience with fully implementing QCs in organizations. The QC training takes

several days and costs a lot. Management should, however, spend the money, because when the training hasn't been done properly, the chances for the QC to fail are big (Metz, 1982).

In the following sections the training of the respective QC functions will be discussed. These discussions are based on some articles and represent the general view on training. Detailed descriptions of QC training can be found in Ingle (1982), Metz (1982), Cox (1981), Harshman (1982), P.C. Thompson (1982), and Crisci (1983). The information in section 5.3.1 has been primarily based on these six references. Other sources that have been used are Hanley (1980), Juran (1981a), Steele et al (1987) and Smeltzer and Kedia (1987).

How important training for QC programs really is, is best presented by Juran (1981a):

'In the West, training in the quality sciences has been largely confined to members of the specialized quality departments: quality managers, quality engineers, reliability engineers, inspection supervisors, quality auditors. Such categories constitute only about 5 percent of the managerial and specialist forces in the companies. In contrast, the Japanese have trained close to 100 percent of their managers and specialists in the quality sciences. With such an inbalance in training, there is no possibility for the West to overtake the Japanese. (...)

Some training needs are common to many categories of managers and specialists. The major commonalities include the universal sequence of events for improving quality and reducing quality-related costs, the universal feedback loop for control, and fundamentals of data collection and analysis. (...)

The need for planning of such training efforts becomes evident when we realize that such a massive training program will take years - even a decade - to work its way through the hierarchy, that the special needs of each functional department and job category must be identified and provided for and that the costs are substantial.'

Training for Quality Circle members

Members should be trained for the first 8 to 10 QC meetings, by the QC leader, facilitator or coordinator. Mostly the QC leader will be the trainer. The training includes (P.C. Thompson, 1982):

1. Motivating introduction.
2. QC concept: structure and process.
3. Brief history of the development and spread of QCs.
4. Basic meeting skills: role of leader, members, secretary, advisor and agenda.
5. Basic QC problem-solving techniques (see section 1.5.2).
6. Basic QC problem solving process: identifying and analyzing the problem, generating and choosing a solution, presenting the solution to management and implementing and evaluating the solution.
7. Rules of the QC process in the organization.

Training for Quality Circle leaders

QC leaders need to be trained for about 8 to 16 hours in e.g. a two-day session (P.C. Thompson, 1982; Ingle, 1982). Leaders can be trained by the facilitator, coordinator or professional trainer. Leaders need additional training in leadership, communication and management (Ingle, 1982). Training for QC leaders includes (P.C. Thompson, 1982):

1. The QC member training.
2. Why some supervisors fear QCs.
3. How QCs can benefit the supervisor.
4. Participative vs. authoritative leadership.
5. Planning, leading and evaluating a QC meeting.
6. The dont's - what not to do as a QC leader.
7. Preparation to teach member course.

Training for the Facilitator

The proper training of the Facilitator(s) is crucial to the success of QCs. The Facilitator can be trained by the Coordinator, fellow Facilitators, but most of the time by a professsional trainer. The training lasts for several days. Training of the Facilitator includes (Ingle, 1982):

1. The QC leader training.
2. Teaching techniques.
3. Learning techniques.
4. Human relations.
5. Statistics (advanced).
6. Group dynamics.
7. Workings of the company.

Training for the Coordinator and Steering Committee

Middle and higher management in the role of Coordinator or member of the Steering Committee need a 4 to 8 hour training in the fundamentals of a QC program. The training will be conducted by a professional trainer, mostly from outside the organization. A QC training for top management could be as follows (Ingle, 1982):

1. Introduction.
2. History of QCs.
3. Review of Japanese success compared to that of the West.
4. Total quality control concept.
5. QC operation.
6. Functions of members, leaders and facilitators.
7. Statistical techniques used in QCs.
8. Project presentations.
9. Proposed implementation plan along with objectives.
10. Review and discussion.

Middle management needs additional training because they feel a lot of authority when QCs are going to be implemented. The training should take care of this fear.

Who does the training

There is not a unanimity in the literature on the issue who has to do the QC training. Ingle's and Metz's views don't seem to be controversial. In this report the view of Ingle (1982) and Metz (1982) have been used in the previous sections. It is useful to listen to what Ingle has to add for the role of the facilitator (likewise emphasized by more authors, e.g. Metz, 1982; Crisci, 1983):

'A facilitator plays an important role in coordinating the training. He has to make sure that proper attention has been given to all necessary details such as training rooms, training aids, bomoks and other materials. He also arranges the courses for top management, middle management and other people whose support is essential to the program. Departments like industrial relations and human resource development also aid in training. As the program grows, additional help may be sought from outside. Outside specialists in the field of Quality Control statistics and human relations help to educate the Circle members and enhance the training program.'

P.C. Thompson (1982) thinks that every organization, large and small, should have a full-time trainer, or at least a full-time advisor or progress administrator who doubles as a trainer. It won't suffice to send people to outside training courses or bring in temporary trainers.

Training materials and contents

Training materials can be developed by the organization itself, but it is perhaps cheaper and wiser to buy materials from institutions with credentials, such as the Quality Circle Institute, International Association of Quality Circles and the American Society for Quality Control (addresses e.g. in Ingle, 1982; Chase, 1983). Training materials are available through commercial ventures, state agencies, institutes and universities (Steele et al, 1987). Cox (1981) on hiring an outside trainer: 'The one crucial asset of the outsider is that he or she is an outsider'.

Smeltzer and Kedia (1987) researched the training needs of QCs. The authors think that most training materials are not sound because they are copied from the Japanese and not adapted to the American culture. The major cultural differences relevant to QC member training are the

systems of employment, promotion, on-the-job training, decision making and a sense of responsibility. Therefore, U.S. employees need a different training orientation than the Japanese. U.S. employees may need more training in human relations (also see Metz, 1982).

Smeltzer and Kedia found group human-relations skills were considered (by 76 QC members) significantly more important than problem-solving skills in 10 to the 16 comparisons, while problem-solving skills were not significantly more important in any of them. After reviewing six different packages of QC training materials, they found them to be inadequate to teach the human-relations skills. Smeltzer and Kedia conclude with a plea for designing better training materials. That Americans tend to overload the necessity for training in human-relations skills has also been observed by Crisci (1983). To Crisci this means training in general communication skills, interpersonal relations and group dynamics.

Training is an ongoing process

Ingle (1982) and P.C. Thompson (1982), emphasize that training is a never-ending process. Everybody involved in QCs needs to be retrained for reinforcement of knowledge and skills and needs to be trained in new techniques. Because QC members are rotating, new QC members, but also QC leaders and Facilitators, must be trained from the start. The Facilitator being responsible for the largest share of the training program is continuously actively involved with training for QCs.

P.C. Thompson (1982) notes that American managers view the QC training in the narrow sense of training, rather than in the broad sense of learning. Quality Circle activities are a continuous educational process in which members train themselves. The QC training program just gets the program started.

Metz (1982) did some basic diagnostic work on six months old QC programs. He wanted to determine not only how initial QC training could be improved, but also to identify any additional specific skill needs of QC leaders after the QC program had started. This is what Metz found:

1. QC implementation training should not be short-cut or reduced.

2. Training content quality and program design is important and commercially available programs appear to be superior to 'home-grown' products.

3. QC instructor skills and experience are important to effective learning of Facilitatos and QC leaders.

4. Middle managers need to learn not only the basics of QC process and techniques, but also how to positively reinforce participative behaviors in their supervisors and QC leaders.

5. QC leaders need more practice in modeling non-directive leadership behaviors as part of initial implementation training.

6. All individuals in the organization, from white collar to blue collar, appear to need complete training in the application of the QC problem-solving process and techniques.

7. Facilitators need to develop increased skills in two areas: the making of interventions into the QC task and process and the ability to identify and reinforce desirable participative behaviors of QC leaders.

Considerations for training

Harshman (1982) reports the following considerations for training:

'There is increasing evidence that the type of organization and the target population influence some aspects of training. For example, some types of workers may be able to move more quickly to sophisticated statistical analysis techniques than other types. Or, it may be necessary to construct a different training plan for a high-technology communications company circle than for a circle in a blast furnace at a steel mill.

A second consideration is that training should reflect the goals of the QC effort. If the effort is designed to focus primarily on quality, then teams' training will be heavily weighted with quality control techniques. If a long-term goal is to make teams self-sufficient, then group process and meeting management skills should be added to training.

Third, the stage of development of the process (or teams) will influence the training schedule and content. For example, once a team learns the basic problem-solving process and applies it a few times, there may be an opportunity to teach the members more sophisticated data-gathering and analysis techniques.

As one looks at the previous considerations, it is clear that no single approach to training or curriculum is appropriate to or sufficient for the installation of QCs in a given setting.'

5.3.2 Four functions for a Training Department

In the literature there has been found no specific information on the role of a training department (TD) as a trainer for QC training. QC members are trained by QC leaders. QC leaders are trained by professionals in the field of QCs. Many authors give a more important role to external consultants: they should do all the QC training, especially in the beginning (and except for the QC members training). But no author recommends that the TD should do this training job.

However, if the TD acquires the QC training expertise, there seems to be no reason why the TD cannot do the QC training. Especially in conjunction with the other three roles for a TD, the TD could be able to perform the QC training job well.

The role of user

In the literature no example of a TD using QCs to improve its own performance has been found. Only one TD specific application to use QCs for has been noted by Field and Harrison (1983): curriculum development. There is no reason why a TD wouldn't be able to use QCs for themselves. It is rather surprising that there isn't even found a single case study. One could say: 'TD's : wake up!

The role of responder

Mourey and Mansfield (1984) make a little comment on QCs generating training needs: 'sometimes circle members ask to be trained in other kinds of problem-solving techniques such as work simplification or time and motion studies. Management must be prepared to respond to this request'.

Apart from this, nothing has been found. This is very, very surprising because it is hardly plausable that QCs analyze problems week in week out and never conclude that there is a deficiency in their own knowledge and skill levels. It must be the case that QCs every now and then generate or discover training needs and what is more desirable that a TD can respond to such training needs. From the literature, it seems to be that a major promising benefit of QC use has been overlooked: QCs yield training needs.

The role of administrator

In the literature there has not been found an example of a QC used as an evaluation group for training activities or training courses. Again one could ask: Why not? A QC with someone from the TD as QC leader and trainees as QC members could form a group to identify, analyze and solve problems in the training courses the trainees went through. This application of QCs fits well to what a sound evaluation prescribes: participation of everyone, especially those directly involved, namely the trainees. Because in such a QC the trainees are partly responsible for improving their own course (i.e. evaluating and revising), improved trainee morale can be expected. Critique trainees have in relation to the TD can be used as a source for problem identification in a QC. The trainees then can personally help to improve their 'own' learning and teaching processes!

Why haven't QCs been used like this?

Synthesis of four applications

The overall synthesis of the four applications of QCs in training and development can be presented in a few sentences. First, there is no literature on any of the four applications. Second, all four applications seem to be reviewed and more needs to be written on the use of QCs in training and development. QCs are a management fad, isn't it time they become an education fad? At least they get more attention then.

6. CONCLUSIONS

Are there education specific obstacles to the implementation of QCs?

There are a few obstacles that are typical for organizations in the field of education, but these obstacles don't seem to be very strong. If the will power is available, management in education can make QCs as successful as in business and industry.

What do these obstacles look like?

The most important obstacles are the seeming lack of tangible results in education, the non-tradition of group decision making, participative management and the confusion over formal lines of responsibilities.

To what extent would these obstacles also occur in the area of training and development?

These obstacles may be valid for some training departments, but it doesn't seem typical for training departments. There is however no research study available to make a definite statement.

What is known in the literature about the training for QC use?

Only a few articles discuss this topic in detail: Metz (1982), Harshman (1982) and Cox (1981). It is widely known in the literature that proper training is crucial to QC success. Everyone in the organization involved should be thoroughly trained and management shouldn't cut on financial resources for training. QC training is a continuous process.

To what extent can QCs be a useful contribution or improvement of the performance of a training department, respectively in the role of trainer, user, responder and administrator?

It is surprising to find that there is simply no information in the reviewed literature. All four roles, however, seem to be promising for the use of QCs, especially the role of administrator.

7. AFTERTHOUGHTS

This study showed few answers on the questions for investigation. More detailed answers require further research. This chapter will consider some aspects on QCs in retrospect, with the aim to give the reader a comprehensive view on the possibilities and the problems of the QC movement.

There is a lot of literature on QCs but the largest part is not of sufficient quality. Especially the QC literature in the most popular years of the QC movement in the U.S. (1978-1983) is not very useful in writing a study like this. A range of useful publications however does exist and these publications don't have to meet the standards Steel and Shane set in section 3.3. Although for empirical research findings, that would be ideal, for the use of studying QCs in training and education publications that don't meet these standards can still be very useful. Apart from this, the few sound empirical publications, according to Steele and Shane, were all conducted within the U.S. Army. That doesn't make the results of these studies transferrable to non military organizations.

The sample of sound literature that was reviewed revealed some common elements. QCs can be a (not: the) tool for the whole organization to improve its effectiveness.

The effects QCs can yield are improving effectiveness and efficiency of organizational processes, be that technical, financial or social processes. The area of effects QCs can yield seems to be unlimited although most promising are the effects on interpersonal and interdepartmental relationships: improved communication, understanding of each other and decreased absenteeism and frustrations are only a few examples. QCs work from top to bottom, throughout the organization.

The main problem with QCs is however that they have an inherent weakness: they need to a certain extent operate within the social effects they are claimed to produce themselves. Organizations (especially top and middle management) need to be prepared but also ready, fit for QCs. Organizations have to have to some extent a participative environment. Without such an environment QCs will almost certainly not succeed. Thus QCs have a tremendous potential

for organizations to be productive, but they need a catalyst to initiate the effects of that potential.

QCs were (not: are) a fad and yes: they can be compared to other group (problem solving) techniques. But they are more than that. No other management or business fad has had such a big impact as QCs had. No other management or business fad also showed that it could be treated as a serious technique, having nothing to do with a fad on such a wide scale, i.e. in Japan. Hardly any other management or business fad has had such a tremendous potential *throughout* the organization and with possible effects on so many different areas.

The point made that QCs have never been a fad in Japan is at the same time proof that QCs do work. The fact that they don't in a fairly vast amount of cases in the West is not due to cultural differences. The QC failure in the West is mainly caused by management being not sensitive enough to the requirements made by QCs even before installation, by management being too impatient to wait for positive effects of QC activities and mainly by the general opinion that QCs *are* a fad. No, they are not if you don't consider them as a fad.

The use of QCs in training and education has been bad documented, there are hardly any sound publications. The authors pay much attention to aspects directly related with QCs but they don't give attention to literature that indirectly relates to QCs, like literature on school organizations or organization theories. The reason why seems to be unknown. That QCs can be applied in training and education is without doubt. Training and education even have an advantage over business and industry in general: they are used to work in groups, with groups and to group decision making.

What should happen in the future is the following. First, more and better research is needed to find the exact effects QCs can yield under what conditions. Up to now very little theory building blocks are available. We need to have a theory on how QCs exactly work. The underlying motivation theories don't suffice although they provide a sound base for further theory building. Second, management in training and education should reconsider the QC concept and seriously balance potential benefits and caveats QCs can have for their department or organization. If the balance is a positive one management should consider implementing QCs in their training or education department or organization. Last, and certainly not least, other literature that shows a relationship with the QC concept should be noticed and possibly

integrated. Other literature, being literature on other group techniques, on fads in general and whatever seems to be relevant. Studied should be the similarities and differences between QCs and related phenomena so that we can learn from these other phenomena and to what extent their effects and conditions under which they work are transferable to the QC concept.

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APPENDIX A: A STATEMENT ON QUALITY CIRCLES

Exhibit 6. Statement on Quality Circles at Morton Chemical

Definition
A Quality Circle is a team of people, who do similar work, meeting regularly to discuss and solve problems related to their work.

Organization
A. Circle Members
1. Are volunteers
2. Are free to join, not to join, or to drop out of a circle
3. Identify, analyze, and solve problems related to their work
4. Can accept or refuse problems submitted from any source
5. Present potential solutions of problems to management for approval
6. Will not discuss during meetings the following:
   a. Salaries and benefits
   b. Hiring and firing policies
   c. Formulating new products
   d. Personalities
7. Strive to improve communications between all employees
8. Meet once a week for one hour and are paid for one hour overtime.

B. Circle Leaders
1. Are chosen by the circle members
2. Train circle members in Quality Circle techniques
3. Work with the facilitator to maintain continuity of the Quality Circles Program
4. Are responsible for the operation of the circle

C. Facilitator
1. Is a volunteer approved by the Steering Committee
2. Is responsible for the Quality Circle Program
3. Trains leaders and members in problem solving techniques
4. Maintenance records
5. Interfaces between circles, the Steering Committee, and other individuals and groups within the company

D. Steering Committee
1. Will be supportive of the Quality Circles Program
2. Will provide guidance and direction to the Quality Circles
3. Will attend circle meetings and management presentations if requested
4. Will implement solutions to problems recommended by quality circle when feasible and practical

E. Goals
1. To allow circle members to recommend solutions to problems in their work environment
2. To improve communications between all employees at all levels
3. To improve employee knowledge of Polyset manufacture, control, and end use
4. To create an atmosphere of trust, understanding and mutual respect among all employees of the Electrical/Electronic Materials Group
5. To improve quality, productivity and working conditions by finding solutions to problems affecting our group

From Gryna, 1981, p. 51-52

APPENDIX B: METHOD OF LITERATURE SEARCH

For the search of QC literature, in the period october - december 1988, the following resources were used:

1. The PICA system of the University of Twente. Identifiers were 'kwaliteitscirkels', 'kwaliteitskringen', 'quality', 'circles' en 'kwaliteitsverbetering'. These identifiers were looked for in titles of publications. The yield was 4 useful publications.

2. Bibliografic magazines were reviewed on the identifiers 'quality circle(s)' and 'quality circles in education'. Three magazines were searched:

   - Education index, vol. 57(1) sep. 1985 through vol. 60(4) dec. 1988; 15 magazine articles were found.

   - Current index to journals in education, vol. 20 jan. - dec. 1988; 3 magazine articles were found.

   - Current contents, vol. 20(38) sep. 1988 through vol. 20(46) nov. 1988; 7 magazine articles were found.

Because reviewing the bibliografic magazines was very time consuming and yielded but marginal results, decided was to search on CD-ROM. The ERIC database in Syracuse NY was used as source. Identifier was 'quality circles'. The search yielded 128 publications in the period 1980 - 1988. There were 80 magazine articles and 48 reports, papers or books. There was a small overlap with the results from the bibliografic magazines.

Of the comprehensive list so far, only about 20 out of 150 publications could be found within the University of Twente. The rest was ordered from other institutions in the Netherlands and from some institutions in the United Kingdom. A total of about 125 publications was received and a closer review of the publications learned that about 80 were useful for thorough investigation.

Based on this sample of 80 publications, the snowball-core-method was used. In the lists of references of the 80 publications it was calculated which publications were referenced most frequently. Those publications were considered to be 'classics' in the field of Quality Circles. The classics that were not in the sample of 80 were ordered.

While investigating the sample other relevant publications were discovered, or because the author(s) mentioned them, or because they seemed to be interesting from the title appearing in the list of references. A fairly vast amount of these later found articles could be found in the library of rthe faculty of Industrial Engineering, the Central Library of the University of Twente and in the private collection on Quality Circles of José Gieskes of the faculty of Industrial Engineering.

A total of over 110 publications were used in this report.

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